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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,243	03/25/2004	Kramadhathi V. Ravi	ITL.1126US (P19032)	6714

21906 7590 03/24/2005

TROP PRUNER & HU, PC  
8554 KATY FREEWAY  
SUITE 100  
HOUSTON, TX 77024

EXAMINER
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QUACH, TUAN N

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<p style="text-align: center;"><b>Office Action Summary</b></p>	<p>Application No.</p> <p>10/809,243</p>	<p>Applicant(s)</p> <p>RAVI ET AL.</p>	
	<p>Examiner</p> <p>Tuan Quach</p>	<p>Art Unit</p> <p>2826</p>	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 March 2005.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 1-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

Claims 18-28 are elected without traverse. Claims 1-17 are withdrawn from consideration.

Claim 27 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 27 is erroneous as "said non-carbon diamond" lacks antecedent basis from base claim 22; the phrase "non-carbon diamond" is further erroneous or self-contradictory by definition of diamond.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 18, 19, 20, 22, 23, 26, 27, 28 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0942072 ('072).

Regarding claims 18, 19, 20, 22, 23, 26, 27 '072 teaches a semiconductor structure comprising a substrate a film, e.g., 81-83, containing significant amount of sp<sup>2</sup> and sp<sup>3</sup> bonded carbon, e.g., corresponding to diamond (sp<sup>3</sup>) and non-diamond form or graphite (sp<sup>2</sup>), [0013], [0026]. See the abstract, [0012], [0013], Fig. 8, [0036]. Note that the dielectric constant being less than 2 in claim 18 is anticipated in the range of

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less than 3; regarding claim 19, the porosity of 50 % is also anticipated, e.g., a range of 20% or greater.

Regarding claim 20, the metallic film such as wiring over the film e.g., layers 77, 79 is also shown. Regarding claim 28, the semiconductor substrate is shown including region 70/72/73 and region 10, e.g., Fig. 8, and Fig. 1A.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over '072.

'072 is applied as above. Regarding the parameters in claims 18 and 19, it would have been further obvious and would have been within the purview of one skilled

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in the art to have selected and optimized the desired dielectric constant and porosity given the teachings of '072 delineated above and particularly at [0032] wherein the increased porosity and its assistance in lowering the dielectric constant is delineated.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over '072 taken with Matsubara et al..

Regarding 21, the use of metallic layer including copper would have been conventional and obvious as evidenced by Matsubara et al. 6,372,628 since such copper material for wiring is notoriously conventional as evidenced by Matsubara et al. column 16 line 45.

Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over '072 taken with Matsubara et al. or Gruen et al. .

Regarding claim 24 and 25, the use of masking for patterning is conventional as evidenced by Matsubara et al. 6,372,628, the abstract, or Gruen et al., 2004/0129202, [0011]. Accordingly, it would have been conventional and obvious to have employed masking which includes hard masking for patterning such layer.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Grill et al., Jeng et al, Grill et al., Hukari et al. are cited.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is (571) 272-1717. The examiner can normally be reached on M - F from 8:30 AM to 4:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1562.



**Tuan Quach**  
**Primary Examiner**